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Pesticide Fact Sheet Number 168
Quizalofop Ethyl

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16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, science findings.

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EPA

Pesticide Fact Sheet

Name of Chemical: Quizalofop Ethyl
Reason for Issuance: Registration of New Chemical
Date Issued: June 10, 1988
Fact Sheet Number: 168

1. Description of Chemical

Generic Name: Ethyl 2-[4-(6-chloroquinoxalin-2-yl oxy)phenoxy]propanoate
Common Name: Quizalofop Ethyl, DPX-Y6202
Trade Name: DuPont Assure Herbicide
EPA Shaughnessy Code: 128201
Chemical Abstracts Service (CAS) Number: 76578-14-8
Year of Initial Registration: 1988
Pesticide Type: Herbicide
Chemical Family: Phenoxy Propionic Ester
U.S. and Foreign Producers: E.I. du Pont de Nemours & Company, Inc.
Nissan Chemical Industries, Ltd.

2. Use Patterns and Formulations

Application Sites: Terrestrial food crops

Major Crops Treated: Soybeans

Types and Methods of Application: Foliar, applied broadcast by air or ground equipment for control of annual and perennial grasses. It is applied postemergence to both crops and grasses.

Application Rates: Up to 4 ounces active ingredient per acre.

Types of Formulations: 9.5% EC

Usual Carrier: Water

3. Science Findings

Summary Science Statement: The submitted data are acceptable to the Agency. Quizalofop ethyl has low acute toxicity, Category III for acute oral and acute inhalation (technical) and primary eye irritation (formulation), and Category IV for acute oral, acute

dermal, and primary dermal (formulation), acute dermal, primary dermal, delayed hypersensitivity, and primary eye irritation (technical). It was not oncogenic to rats or mice [increases in liver tumors occurred at highest dose which exceeded the maximum tolerated dose (MTD)] and not teratogenic to rats or rabbits and not mutagenic. Quizalofop ethyl is practically nontoxic to birds or honey bees; highly toxic to freshwater fish, very highly toxic to invertebrates, moderately toxic to marine fish and very toxic to marine invertebrates. It has a low potential to leach and contaminate ground water and does not accumulate in fish. The nature of the residues in plants and animals is adequately understood and adequate methodology is available for enforcement of tolerances in soybeans, processed soybean food/feed items and meat, milk, poultry, and eggs.

Chemical Characteristics:

Physical State: Technical, solid; 9.5% EC, liquid
Color: Technical, white; 9.5% EC, amber
Odor: Technical, None; 9.5% EC, aromatic/petroleum
Melting Point: 91 °C
Specific Gravity: Technical, 1.35 grams per cubic centimeter (g/cc^3); 9.5% EC, 1.01 g/cc^3
Molecular Weight: 372.81
Solubility: In distilled water at 25 °C, .3 milligrams/liter (mg/L); in 0.05 N sodium phosphate buffer at 25 °C as a function of pH:

pH 5.4	0.34 mg/L
pH 7.1	0.31 mg/L
pH 9.0	0.29 mg/L
pH 10.4	0.31 mg/L

In organic solvents at 25 °C:

Acetone	110 g/L
Acetonitrile	86 g/L
Ethanol	9 g/L
Benzene	290 g/L
Xylene	120 g/L
N-hexane	2.6 g/L
Dioxane	350 g/L

Unusual Handling Characteristics: No special handling needed.

Toxicology Characteristics:

Acute Studies (9.5% EC)

Acute Oral Toxicity - Rat: 6600 mg/kg (males), 5700 mg/kg (females); Toxicity Category IV

Acute Dermal Toxicity - Rabbit: > 5000 mg/kg; Toxicity Category IV

Primary Dermal Irritation - Rabbit: Not a primary skin irritant; Toxicity Category IV

Primary Eye Irritation - Rabbit: Mild irritant; Toxicity Category III

Acute Studies (Technical)

Acute Oral Toxicity - Rat: 1670 mg/kg (males), 1480 mg/kg (females); Toxicity Category III

Acute Dermal Toxicity - Rabbit: > 5000 mg/kg; Toxicity Category IV

Acute Inhalation - Rat: 4.8 to 5.8 mg/L; Toxicity Category III

Delayed Hypersensitivity - Guinea Pig: Not a sensitizer.

Primary Eye Irritation - Rabbit: Not an eye irritant; Toxicity Category IV

Primary Dermal Irritation - Not a skin irritant; Toxicity Category IV

Chronic Toxicology:

90-Day Feeding Study - Rat:
No-observed-effect level (NOEL) = 2 milligram/kilogram/day (mg/kg/day) lowest dose tested (LDT)

90-Day Feeding Study - Mouse:
NOEL less than (<) 15 mg/kg/day (LDT)

6-Month Feeding Study - Dog:
NOEL = 2.5 mg/kg/day

2-Year Chronic Feeding/Oncogenicity Study - Rat:
Systemic NOEL = 0.9 mg/kg/day
Systemic lowest effect level (LEL) = 3.7 mg/kg/day
No oncogenic effects up to and including 15.5 mg/kg/day [highest dose tested (HDT)]

18-Month Chronic Feeding/Oncogenicity Study - Mouse:
Systemic NOEL = 12 mg/kg/day
Systemic LEL = 48 mg/kg/day
No oncogenic effects up to and including 12 mg/kg/day; an effect (increase in combined benign and malignant liver tumors) occurred at the HDT which exceeded the MTD.

1-Year Feeding Study - Dog:
NOEL = 10 mg/kg/day (HDT)

Teratology Study - Rat:
NOEL > 300 mg/kg/day (HDT)
No teratogenic effects at 300 mg/kg/day (HDT)

Teratology Study - Rabbit:
Maternal toxic NOEL = 20 mg/kg/day
Maternal toxic LEL = 60 mg/kg/day (HDT)
Developmental NOEL = 60 mg/kg/day (HDT)

2-Generation Reproduction - Rat:
Fetotoxic NOEL = 1.25 mg/kg/day
Maternal NOEL = 5 mg/kg/day
Developmental NOEL = 1.25 mg/kg/day
No reproductive effects up to 20 mg/kg/day (HDT)

Mutagenicity (Salmonella typhimurium): Negative

Mutagenicity, Chromosomal Aberrations (CHO) In Vitro: Negative

Mutagenicity, Unscheduled DNA Synthesis (Rat): Negative, not mutagenic

Metabolism - Rat: Readily absorbed from gastrointestinal tract and excreted rapidly.

Major Routes of Exposure:

The major route of exposure is via eye contact (formulation) and acute oral and acute inhalation (technical).

Physiological and Biochemical Characteristics:

Foliar Absorption: Rapid.

Translocation: Systemic after absorption by foliage.

Mechanism of Pesticidal Action: Inhibition of fatty acid biosynthesis in susceptible plants. Potential to Contaminate Ground Water: Based on the low potential for leaching, quizalofop ethyl has a low potential to contaminate ground water.

Metabolism in Plants and Animals: Metabolized to several nonherbicidal compounds.

Persistence in Animals and Plants: Does not persist in either animals or plants.

Environmental Characteristics:

Absorption and Leaching in Basic Soil Types: DPX-Y6202 was poorly absorbed in two sandy loam and two silt loam soils and characterized as immobile. DPX-Y6202 and its acid metabolite are immobile to moderately mobile and have a low potential to leach.

Microbial Breakdown: Rapidly metabolized to DPX-acid which further degraded to phenols and CO_2.

Loss from Decomposition and Volatilization: None expected.

Bioaccumulation in Fish: Does not accumulate in fish.

Resultant Average Persistence: Half-life of 139 and 145 days in silty clay loam and silt loam, respectively.

Exposure of Humans and Nontarget Organisms to Pesticide or Degradates: Human risk from exposure is minimal because of low acute toxicity (Categories III and IV). Nontarget organism risk is minimal because maximum expected residues on soil and water do not approach the toxicity values for organisms tested.

Ecological Characteristics:

Avian Acute Oral Toxicity - Mallard Duck: > 2000 mg/kg.

Avian 8-Day Dietary Toxicity - Mallard Duck: > 5000 ppm.

Avian 8-Day Dietary Toxicity - Bobwhite Quail: 5620 ppm.

Fish Acute 96-Hour Toxicity - Rainbow Trout: 870 ppb.

Fish Acute 96-Hour Toxicity - Bluegill Sunfish: 460 ppb.

Fish Acute 96-Hour Toxicity - Mysid Shrimp: 0.15 ppm.

Fish Acute 96-Hour Toxicity - Mysid Shrimp: 0.15 mg/L.

Acute Toxicity (96-Hour) Test for Shrimp, Static - Mysid Shrimp: 0.25 mg/L.

Acute Toxicity Test Mollusc, 96-Hour Flowthrough - Eastern Oyster: 187 mg/L.

Acute Toxicity Test for Mollusc, 48-Hour Embryo and Larvae - Eastern Oyster: 0.079 ppm.

Acute Toxicity Test for Estuarine Fish, Static - Sheepshead Minnow: 1.4 mg/L.

Acute Toxicity Test for Estuarine Fish, Static - Sheepshead Minnow: 1.76

Freshwater Fish Early Life Study - Fathead Minnow: Maximum allowable toxic concentration (MATC): 11 to 30 ppb.

Acute Toxicity to Honey Bee: > 50 ug/bee.

Quizalofop ethyl is practically nontoxic to birds, highly toxic to freshwater fish, very highly toxic to invertebrates, moderately toxic to marine fish, very toxic to marine invertebrates, and relatively nontoxic to honey bees.

Tolerance Assessment:

The nature of the residues in plants and animals is adequately understood and adequate analytical methods are available for enforcement purposes.

Tolerances are established for the combined residues of quizalofop (2-[4-(6-chloroquinoxalin-2-yl oxy)phenoxy]propanoic acid and quizalofop ethyl (ethyl-2-[4-6-chloroquinoxalin-2-yl oxy)phenoxy] propanoate) all expressed as quizalofop ethyl in or on the raw agricultural commodity soybeans at 0.05 part per million (ppm).

Tolerances are established for the combined residues of quizalofop, quizalofop ethyl, and quizalofop methyl (methyl 2-[4-(6-chloro-quinoxalin-2-yl oxy)phenoxy]propanoate), all expressed as quizalofop ethyl in or on the following raw agricultural commodities.

Commodity	ppm
Cattle, fat	0.05
Cattle, meat	0.02
Cattle, mbyp	0.05
Eggs	0.02
Goats, fat	0.05
Goats, meat	0.02
Goats, mbyp	0.05
Hogs, fat	0.05
Hogs, meat	0.02
Hogs, mbyp	0.05
Horses, fat	0.05
Horses, meat	0.02
Horses, mbyp	0.05
Milk	0.01
Milk, fat	0.05
Poultry, fat	0.05
Poultry, meat	0.02
Poultry, mbyp	0.05
Sheep, fat	0.05
Sheep, meat	0.02
Sheep, mbyp	0.05

Tolerances are established for the combined residues of quizalofop and quizalofop ethyl, all expressed as quizalofop ethyl in or on the following processed food/feed commodities.

Commodity	ppm
Soybean soapstock	1.00
Soybean hulls	0.02
Soybean meal	0.50
Soybean flour	0.50

The acceptable daily intake (ADI) based on the 2-year rat feeding/oncogenicity study (NOEL of 0.9 mg/kg/day) and using a hundredfold safety factor is calculated to be 0.009 mg/kg/day. The theoretical maximum residue contribution (TMRC) from these tolerances is calculated to be 0.000216 mg/kg body weight/day, which occupies approximately 2.4 percent of the ADI. There are no other published tolerances for this chemical.

4. Summary of Regulatory Position and Rationale

The available data submitted to the Agency provide sufficient information to support a conditional registration provided that the following studies are repeated: acute toxicity to freshwater invertebrates and a confined rotational crop study. Therefore, the Agency has accepted the use of quizalofop ethyl on soybeans.

5. Summary of Data Gaps

	Due Dates
Environmental Fate Data	24 Months
Acute Toxicity to Freshwater Invertebrates	12 Months

6. Contact person at EPA:

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DISCLAIMER: The information in this Pesticide Fact Sheet is a summary only and may not be used to fulfill data requirements for pesticide registration and reregistration.